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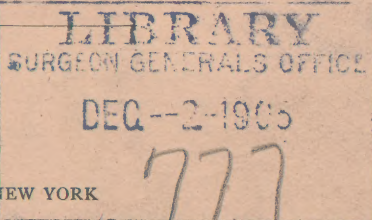
Bottini's Galvano-Caustic Radical
Treatment for Hypertrophy of
the Prostate. ❀ ❀ ❀ ❀ ❀

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YORK INFIRMARY.

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BOTTINI'S GALVANO-CAUSTIC RADICAL TREATMENT FOR HYPERTROPHY OF THE PROSTATE.¹

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MR. PRESIDENT AND GENTLEMEN: The surgeon who is called upon to-day to give his advice in regard to the best method of treatment for hypertrophy of the prostate gland still finds himself in a rather embarrassing position. It is true, quite a multitude of operations designed for the radical cure of this trouble are at our disposal, yet to propose the proper one in a given case is doubtless a difficult task.

A great deal has been written on this subject, many discussions have been held concerning the same here and abroad, but we are far from being able to draw definite conclusions as to the value and indications of the various operations.

As the matter presents itself to-day, it seems to me the wiser course, in all cases in which catarrh of the bladder complicates the trouble, not to propose an operation of any kind at once. It cannot be denied that in many instances irrigation of the bladder carried out very carefully by the attending physician under strict

¹ Read at the ninety-second annual meeting of the Medical Society of the State of New York, Albany, January 26, 1898, being part of the discussion: "The Management of Hypertrophy of the Prostate Gland and its Complications." A short abstract of the paper was read also before the section on general surgery of the New York Academy of Medicine, November 8, 1897.

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aseptic precautions, every day or every other day, yields very gratifying results. This treatment is greatly assisted by the internal application of urotropin, from three to eight times a day, eight grains in capsules or oblates (wafers). Only very recently Mendelsohn, Casper, and others¹ called our attention to the great relief this drug affords patients afflicted with cystitis and pyelitis, also in cases of prostatic enlargement. My personal experience fully corroborates this observation. The favorable influence of the drug is explained by the fact that the urine of persons who have taken urotropin internally frequently contains for many days formaldehyde, the antiseptic value of which is well known. Urotropin is a chemical combination of four molecules of ammonia and six molecules of formaldehyde. Of course, irrigation of the bladder will not generally influence the size of the prostate, and hence not reduce the residual urine, although it has frequently been the means also of improving this objective symptom. But the residual urine as such does not bother the average prostatic patient; what bothers him mostly is the infectious inflammation of the vesical mucous membrane that has been carried into the bladder by instrumentation or by micro-organisms that have wandered from the rectum into that viscus. Frequently the irritability of the bladder is partially caused by a present pyelitis.

- If catarrh of the bladder be absent and the case be a recent one that admits of temporizing, we may eventually first try one of the other non-operative methods which have been proposed lately: Rectal tamponade of Manasse, or the parenchymatous injection of cocaine into the testicles with the view to produce atrophy (Couilly), although neither of these proced-

¹M. Mendelsohn, Berliner klinische Wochenschrift, 1898, No. 3; L. Casper, Deutsche medicinische Wochenschrift, 1897, No. 10, Beilage; J. Cohn, Berliner klinische Wochenschrift, 1897, No. 42; E. Schreiber, Deutsche medicinische Wochenschrift, 1897, No. 11, Beilage. The drug was first introduced and recommended by A. Nicolaier, of Göttingen, as a uric-acid solvent. Lately he also emphasized the beneficial influence of urotropin on infectious processes of the urinary system with ammoniacal reaction of the urine.

ures gives much hope for permanent improvement. The feeding with prostatic tablets might also come into consideration (Englisch, Reinert). The latter author gave a promising report on this branch of organo-therapy before the Thirteenth Congress of German Physicians at Munich, 1897. Of course all these procedures could also be combined with the irrigation treatment mentioned before.

But suppose our efforts to alleviate the patient's condition with these means have not been successful; suppose also that the patient be in the fifties, and refuses to have his testicles removed or his vasa deferentia resected—the two operations which, no matter what great improvements may yet be made in the direct interference for hypertrophy of the prostate, will, it seems, forever hold their place in this branch of operative surgery—shall we then in such a given case resort at once to the more serious operation, namely, that of attacking the gland directly with the help of prostatectomy by the suprapubic or the perineal route, or both routes combined? Or shall we try to influence the size of the organ indirectly by tying the internal iliac arteries—a method which, according to my experience, still deserves a place among the operations for the trouble here under discussion? Or shall we in such cases, when the patient refuses to run the risk involved in either of the afore-mentioned operations, establish a suprapubic fistula with subsequent permanent drainage of the bladder?

With reference to the latter procedure, I will state right here that the oftener I have done it the less I like it. It is true one of my patients, now sixty-seven years of age, has worn a permanent catheter in his suprapubic fistula with comparative comfort since 1888, and still drives to the cemetery—he being a church sexton—several times a week or a month, over rough roads, on a coachman's seat, and empties his bladder every couple of hours through the catheter, which is cut short and closed with a wooden plug. On the other hand, I have seen such patients in a pretty uncomfort-

able position, and this in spite of my attempts to relieve them with the aid of a more convenient apparatus for permanent suprapubic drainage of the bladder than that heretofore in use—an apparatus which I devised four years ago and after sufficient trial am now ready to publish.

At this time of the still present uncertainty as to how to advise a patient who is afflicted with this most frequent disease, we are greatly indebted to Dr. A. Freudenberg, of Berlin, for urgently having called our attention, in the early part of last year, to Bottini's galvano-caustic radical operation for hypertrophy of the prostate.¹ It is almost incredible that this, as it seems, splendid operation should have been practised for twenty-two years by virtually only one gentleman—namely, the inventor of the method, Enrico Bottini, of Pavia—and that in spite of the fact that he has repeatedly drawn the attention of the profession to his work.² A possible explanation I can find only in the fact that the instruments used in this operation were formerly made in Italy, and that Bottini for a number of years never finished improving them. A new impetus to follow in his footsteps was given to the medical profession when the well-known house of W. A. Hirschmann, of Berlin, undertook the manufacture of the instrument, making it a very handy and reliable one.

When Bottini performed his first operation, on October 26, 1875, he made use of the so-called "cauterizzatore prostatico," representing an instrument of the shape of a catheter of medium calibre with a short beak, the latter carrying on a porcelain disc a platinum plate about three-fourths inch long. With this plate, made red hot by the electric current, he cauterized the prostate thoroughly at different spots, if necessary

¹ Berliner klinische Wochenschrift, 1897, p. 15.

² "Galvani," 1874, tome x., and "La galvanocaustica nella pratica chirurgica," Milano, 1876 (text-book). Archiv für klinische Chirurgie, vol. xxi., 1877, pp. 1-24, and vol. liv., 1897, Heft i.; previously published in the Italian language in La Clinica Chirurgica, July 31, 1896, tome vii., p. 281.

repeatedly. When the eschar had been pushed off, improvement often began to set in; at times it took thirty days before the patients could notice the effect of the interference.

Two years later Bottini was able to publish five successful cases treated in this way.¹ With increasing experience he discarded the cauterisator and made use only of the second instrument, the "incisore prostatico," which removes the mechanical obstruction to the outflow of the urine at the neck of the bladder by slowly burning a groove or grooves through the same and not by superficial destruction. This instrument² (Fig. 1) shows a male and female arm, not unlike a lithotrite. The beak of the female part forms almost a right angle with its shank, and has at its concave side a deep groove. The shank of the male arm shows a platinum knife, about five-eighths inch long (*Pl. kn.*), which leaves the groove of the female arm on turning an Archimedean screw (*Ar. Scr.*) at the outer end of the instrument. A scale (*sc.*) attached to the latter admits of exactly gauging the length of the groove to be cut. The instrument further shows the so-called cooling apparatus which was added to

¹ Archiv für klinische Chirurgie, xxi., 1877, *loc. cit.*

² The instrument was first demonstrated by me before the surgical section of the New York Academy of Medicine, November 8, 1897.

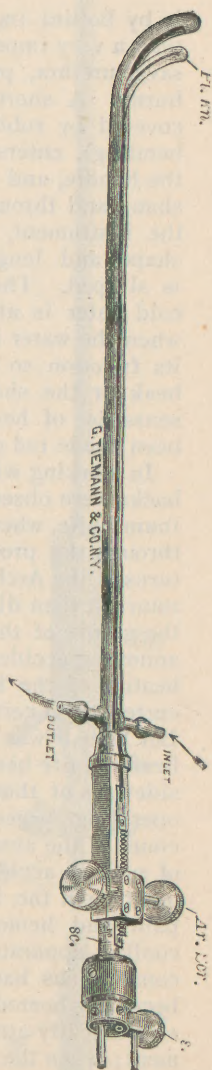


FIG. 1.—Bottini's Incisor.

it by Bottini in 1882, and which, no doubt, constitutes a very important feature, inasmuch as this alone saves urethra, prostate, and bladder from accidental burns. A short metal tube, the outflow of which is covered by rubber tubing (thick walled, to prevent bending), enters immediately below the lower end of the handle, and runs through the entire length of the shank and through the beak to the opposite side of the instrument, there showing an outlet of the same shape and length. Over this another rubber tube is slipped. The nozzle of an irrigator filled with cold water is attached to one end of the tube, and when the water is turned on the mechanism performs its function so exactly that the finger can touch the beak or the shank at any spot without the slightest sensation of heat, although the platinum knife has been made red or even white hot.

In working with this instrument a number of drawbacks were observed. Thus it happened that the platinum knife, when heated and slowly ploughing its way through the prostate, being pulled or pushed by the turns of the Archimedean screw, bent sideways; on its return it then did not slip into and disappear within the groove of the female shank. The reason for this annoying accident was first thought to be insufficient heating of the knife, owing to too weak an electric current, and certainly this factor must be considered. But later it was found oftener in the fact that the well-heated knife became crooked on account of a turning sideways of the entire instrument in the hands of the operating surgeon. This happened so easily on account of the absence of a proper handle. The result of such an accident is that the removal of the instrument from the bladder and urethra is difficult, causes pain and hemorrhage (Czerny). Furthermore, the cooling apparatus, entering the shank below the inconvenient handle, did not prevent the latter from becoming heated by the current. The conductors were eccentrically attached to the upper end of the instrument; when the latter was turned around its longitudi-

nal axis, they became twisted. The instrument on the whole was too light and too long.

A. Freudenberg, of Berlin, who found these drawbacks by practical use, has greatly improved Bottini's instrument with regard to its shape and handiness, as well as to its electro-technic construction and possibility of sterilization (Fig. 2). He somewhat shortened that part of the instrument which enters the urethra and bladder (shank twenty-six centimetres instead of twenty-seven centimetres), at the same time making it considerably heavier by providing it with a compact handle (*Gr.*), seven centimetres long, such as we are used to grasp when working with the lithotrite. He moved the small water pipes of the cooling apparatus (*K*) to the upper end of the handle, and gave them an obliquely downward and inward direction.¹ At this place the rubber tubes will not be compressed so easily by the operator's hand; but they must nevertheless have a sufficiently thick wall not to bend when the instrument is turned. The cold water, running also through the handle, keeps the latter always cool. The two cables are thinner than those in the original Bottini incisor, and, with the help of a silk texture woven around them, are united into one big cable (*L*). The latter, being attached to the cable contact (*P*), can be easily slipped over a

¹ The position of these two tubes will always tell us to which side the beak of the instrument is directed, after the latter has been introduced into the bladder. They correspond to the concave side of the beak.

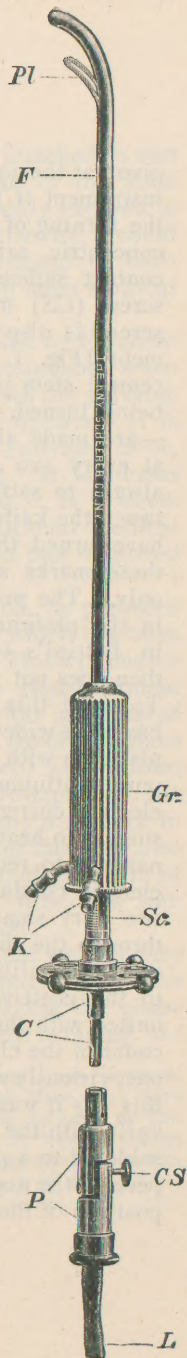


FIG. 2.—Freudenberg's Modification of Bottini's Incisor.

pivot at the upper end of the longitudinal axis of the instrument (*C*). This point moves up and down with the turning of the wheel, and carries both poles in a concentric arrangement. One push on the cable contact suffices to unite the parts. A small contact screw (*CS*) makes and breaks the current. This screw is also found in the original Bottini instrument (Fig. 1, *s*). The scale marks (*Sc*), on the central stem just below the wheel—which latter, by being turned, moves the platinum knife up and down—are made all around the stem and show numbers at every 120° , *i.e.*, three times. This enables us always to satisfy ourselves as to the distance between the knife and its groove, no matter how we may have turned the instrument. In the original Bottini these marks are engraved on one part of the circle only. The principal improvement, however, is found in the platinum knife (*Pl*). As stated above, that in Bottini's incisor sometimes bends sideways and then does not enter the groove of the female shank. To avoid this as much as possible, the groove itself has been widened; the knife is made of an alloy of platinum with iridium, which is much harder than the pure platinum and offers greater resistance to the electric current. For that reason a weaker current suffices to heat it. With this same point in view—namely, to reduce the demands on the battery—the electric conduits were changed. Instead of running two very small wires down to the platinum knife through the shank of the male part, one single wire of double calibre has been substituted. It corresponds to the positive pole. The negative pole is directly united with the metal of the male shank, and, on account of the close contact of the latter with the female one, virtually with all the metal of the instrument. In this way it was necessary to connect but one end of the knife with the wire; the other one could be directly soldered to a projection of the metal at the lower aspect of the male shank. As will be readily seen, the position of the knife is thus made much firmer than it

is in Bottini's incisor, in which it is attached to two wires. By selecting for the occlusion of the male shank a cement which can be thoroughly exposed to water and heat without being affected thereby, it could be arranged to sterilize the entire instrument by boiling, the same as we are wont to do with other surgical implements.

I am sure Bottini's incisor, as modified by Freuden-berg, is the one which will be used by surgeons when dividing the hypertrophied prostate with the galvano-caustic knife introduced through the urethra. It is manufactured in the Electro-Technic Institute of R. Kiss, Berlin, Königgrätzer Strasse 85. It impresses one as being a very reliable instrument.¹ It is worth stating that Bottini, at the last international medical congress, at Moscow, gave preference to this improved instrument.

The operation itself should, if possible, be preceded by a cystoscopic examination, a point which has been emphasized already by Freudenberg. This will enable us to avoid any difficulty during the after-treatment which may be caused, for instance, by the presence of a vesical calculus which has not or could not have been detected with the searcher. It will also inform us regarding the configuration of the prostate, as to the presence of a median lobe, and as to any difference in the size of the lateral lobes, which latter fact may also be corroborated by outlining the internal contours of the prostate with the stone searcher; it is often supplemented by rectal digital examination.

I want to emphasize here the fact that we can very well diagnose the configuration of the prostate with the help of the cystoscope, partly by observing the shape of the internal vesical fold, partly by bringing the

¹ The instruments, Bottini's and Freudenberg's, were imported for me by the Kny-Scheerer Company, 17 Park Place, New York City. Both are now manufactured in this country by this company; Bottini's original instrument also by Messrs. George Tiemann & Co. Freudenberg's instrument was demonstrated by me before the section on genito-urinary surgery of the Academy of Medicine, December 14, 1897.

handle of the cystoscope over to one side of the patient, thus conducting its beak into the bladder as far to the one side as possible. In this way we can often clearly distinguish a swollen median lobe, which then, however, is generally not brilliantly illuminated, but rather lies in the shade. I state this particularly to contradict Dr. E. Fuller, who maintained, at one of the late meetings of the section on genito-urinary surgery of the academy, that this was an impossibility and mainly existed in the phantasy of the observer. To prove the correctness of my statement, I would mention the case of the father of a colleague, on whom I was requested, some seven years ago, to perform cystoscopy for hypertrophy of the prostaie. In this case I distinctly diagnosed a median lobe of the prostate projecting into the bladder, almost as long as the third phalanx of the little finger; there was besides general hypertrophy of the gland. This patient was later operated upon by Dr. Edward L. Keyes, by suprapubic radical extirpation of the gland, when the condition of the prostate was found to be exactly as previously seen by me through the cystoscope.¹

The technique of Bottini's operation is simple. After the bladder has been carefully irrigated and emptied, the posterior urethra is locally anæsthetized with cocaine or eucaïne, one and one-half drachms of a one or two per cent. solution (eucaïne, five per cent.) being injected either into the posterior urethra directly or into the anterior portion of the canal, and then pressed backward by gentle massage over the perineum. Five minutes later the mucous surface will be found to be sufficiently insensible to render the operation painless.²

¹ New York MEDICAL RECORD, 1891, vol. xl., p. 526, Case II.

² Bottini succeeded in doing the operation even without cocaine, and heard his patient complain of a momentary pain only when opening and closing the electric current. If patients suffer from painful spasmodic contractions of the detrusor muscle, when the bladder has been entirely emptied, it seems to me wiser to put them for the brief operation under the influence of general anæsthesia (Schleich's solution No. 1).

Before the incisor is introduced pains must be taken that the bladder is thoroughly emptied, for it is obvious that then the effect of the cautery is far stronger. It is also necessary to test the efficiency of the battery repeatedly before starting the real work. With the help of the rheostat attached to the battery, the electricity needed for heating the instrument is gauged so as to allow the platinum knife to turn thoroughly red hot. If this is carefully attended to, no bleeding will set in after the operation. In order to ascertain how well the heated knife will cut its way through the prostatic tissue, Bottini advises taking a piece of moist sterile gauze and trying the knife on that first.¹ It is, furthermore, necessary that an assistant be ordered to do nothing else but watch the work of the cooling apparatus. He has to see to it that the outflow of water from the instrument never ceases.

These preliminaries having been carefully observed, and the screw at the outer end of the instrument (*CS*, Fig. 2), which makes and breaks the current, having been turned to the left, thus temporarily breaking the current, the instrument is introduced into the bladder in accordance with the rules of ordinary catheterism.

Whoever has seen a case of marked hypertrophy of the prostate when the bladder was opened by suprapubic incision will have found that the gland in a great many cases surrounds the internal urethral orifice in the shape of a collar. With other words, there is a circular swelling at this spot, which, of course, is most pronounced in its lower half. On the basis of this anatomical fact, Bottini burns with his incisor one, two, or, better still, three grooves at one sitting—namely, a short one toward the symphysis, another just opposite directly backward toward the rectum, and a third one through that lateral lobe of the prostate which appears to be the larger one. Following his advice, we shall therefore, in a case of very marked hypertrophy of the prostate, as soon as the instrument

¹ I deem this point to be very important.

has entered the bladder, pull it forward toward the anterior wall of the bladder, at the same time slightly raising the handle outside, until we feel the resistance inside. Then the cooling apparatus is started and the screw at the outer end of the instrument turned to the right, thus making the current. We wait about fifteen seconds until the platinum knife gets red, and then slowly turn the Archimedean screw to the left on Bottini's original instrument, or turn the wheel to the right on Freudenberg's modification, reading on the scale how far we have proceeded. If the knife does not work easily, the current is slightly increased; if it cuts too easily, the current is reduced. After a groove of the contemplated length has been burned, the knife is made to return to the groove of the female shank by turning the screw (wheel) to the opposite side. It is wise, according to Bottini, slightly to increase the current for this procedure. Now the current is broken, and the beak of the instrument turned downward and pulled gently forward, so as to hug the prostate. Then, according to necessity, one or two more grooves are made through the body of the prostate in the same way as just described.¹ If during the operation an assistant auscultates the suprapubic region, he will distinctly hear the noise which is produced by the burning. Sometimes this can be heard even by bringing the ear near the abdomen. The two or three grooves thus having been cut, the current is turned off and the instrument gently extracted from the bladder. The operation is finished. According to the number and length of the grooves cut, it lasts from two to five minutes. The inconvenience caused the patient during and after the operation is exceedingly slight. A physician operated upon by Bottini without cocaine pronounced the procedure less painful than the instillation of nitrate of silver into the prostatic urethra.

¹ In my last two operations I have primarily divided the body of the prostate in its median and lateral lobes and then added a short anterior incision. The posterior (sagittal) incision, down to the floor of the bladder, is certainly the most important one.

Two of Freudenberg's patients stated that the operation had caused them less pain than the preceding cystoscopy. Another said that he preferred it to the examination with the stone searcher.

Soon after the operation most of the patients complain of a burning sensation when commencing to pass water. They may get up right after the operation in order to urinate, and can be permitted to be permanently out of bed on the second day, the general reaction of the operation being in most instances almost *nil*. If the bladder has been carefully irrigated, the patients will rarely develop any rise of temperature; bleeding, if there be any at all, is generally of minimal amount. The urine passed during the first night following the operation is often macroscopically free from blood. In more than eighty cases of this kind, Bottini has not seen a single serious hemorrhage. For this reason he warns against the use of a permanent catheter. Thus the after-treatment is comparatively very simple. If necessary, the bladder should be washed out daily in order to improve the present cystitis — best with a cold solution, as this will strengthen the contractility of the detrusor muscle. This latter may also be accomplished with the help of electricity. Strychnine internally is advisable. It is a matter of course that the detrusor muscle regains its full power of contractility only in course of time.

As regards annoying accidents during or after operation, Czerny once had a bend in the platinum knife which made the extraction of the instrument slightly difficult. This occurrence has been referred to above.

Kümmel, who has operated with the help of the cauterizator in a number of cases of urinary retention, once saw a rather serious hemorrhage on account of the patient having removed the permanent catheter which had been introduced. In order to stop the hemorrhage he then performed suprapubic cystotomy. The patient died a few days later. (As just stated, Bottini warns against the use of a permanent catheter.)

As Bottini maintains, Czerny as well as Kümmel

made use of inferior batteries, which not only are unreliable in their effect but do not heat the knife sufficiently. Freudenberg explains Czerny's experience as being caused by turning the instrument (Bottini's original) when the heated platinum knife is doing its work (see above). It certainly is of greatest importance that a sufficiently powerful and absolutely reliable battery with a rheostat attached be used. As far as I have seen, the storage batteries for sale here do not well answer this purpose; they are not made to bring to red heat so large and thick a platinum knife as the one needed in this operation.¹ At present I use a battery manufactured by Hirschmann, of Berlin. It is, however, so heavy as to require two men to carry it. Freudenberg recommends a battery with an ampere meter, made, according to his design, by Kiss, of Berlin. This is the same concern that has brought the improved incisor upon the market. The ampere meter enables one to know at every moment the exact strength of the current, and thus the degree of heat attained by the knife. I have just brought out a useful small storage battery for Bottini's operation, with the kind assistance of the Kny-Scheerer Company, 17 Park Place, New York City. It is not heavy and can be easily transported.

L. Casper, of Berlin, when discussing² Freudenberg's last paper on this subject, "Zur Bottini'schen Operation bei Prostatahypertrophie,"³ stated that the dangers connected with this procedure were hemorrhage, dribbling, and infection.

Freudenberg saw a secondary hemorrhage in three of his cases. In one of these the bleeding ceased after a permanent catheter had been put in for three days. Here the occurrence was later explained by the

¹ A friend of mine has informed me recently that the Edison-Laland Company is making a battery which would probably do good work.

² *Berliner klinische Wochenschrift*, 1897, No. 45, p. 990.

³ Read before the Berlin Medical Society, October 20, 1897; *Berliner klinische Wochenschrift*, 1897, No. 46, p. 1,002.

discharge of a piece of the prostate, of the shape and size of a split almond. This portion had been cut off from the right lateral lobe, which projected into the bladder—an accident which had never been observed before. In his other two cases the hemorrhage was not at all alarming. In watching these patients after the operation, one ought to be mindful of the fact that hæmaturia generally makes a more serious impression than is warranted by the amount of blood actually lost. Freudenberg believes that the danger of hemorrhage greatly depends upon the operator. This is certainly true. It is self-understood that Bottini's operation, small and easy as it may appear at the first glance, also has its technique. And this technique in all its details must be mastered by practical experience. The result of the operation largely depends upon the proper observation and carrying out of quite a number of details. The length, direction, and number of cuts, the rapidity with which they are made, the amount of current used for heating the knife—all deserve to be mentioned in this connection.

Freudenberg also saw dribbling in a few cases after operation, but in no instance was it marked or did it become permanent.

This observation corresponds with the experience of Bottini, who informed Freudenberg, upon the latter's query, that he never saw enuresis as a result of his operations. Freudenberg, on the other hand, observed enuresis to disappear in three cases when it had been present before the operation. With reference to avoiding this occurrence, he also emphasized the necessity of sufficient practical experience. He believes that enuresis will probably set in if the grooves are burnt through the prostate into the membranous urethra or very close to the latter.

The danger of infection, as far as it might be carried into the bladder by the operation itself, has been eliminated since Freudenberg has completed his improved incisor, which can be sterilized by boiling.

As is natural, a number of objections against Bot-

tini's operation have been raised in the course of time. Webb,¹ McGill,² and others stated that the operation was dangerous. However, Bottini has had but two deaths in a series of more than eighty cases—certainly a minimal death rate for an operation which is almost exclusively performed on old and decrepit patients; and these two deaths occurred before the cooling device had been added to the cauterizator.

Freudenberg lost two patients: one died from embolism into the lungs—an exceptional experience after Bottini's operation so far; the other, a very weak and much-reduced patient, seventy-seven and one-half years of age, died twenty-four days after—better, in spite of the operation.

McGill further believes that the operation could prove of benefit in but exceptional cases, because the real condition of the prostate could be properly made out only with the finger in the bladder or by direct inspection. Nitze's cystoscope refuted this objection as soon as it was raised.

Nitze³ believed that the separated parts of the prostate would grow together again and thus cause a recurrence of the trouble. But, as Freudenberg insists, the act of micturition alone, which each time presses apart the walls of the grooves, renders reunion of the divided parts impossible. The same effect is probably produced by the tonus of the external sphincter muscle, the central fibres of which are divided by the operation. In the main, however, practical experience has proven the contrary of Nitze's objection. Bottini, who by his writings impresses one as being a very careful, straightforward, and upright observer, has never seen a recurrence of the trouble during twenty-two years of actual practical experience.

In perusing the literature of Bottini's operation, I

¹ "Operative Procedures in Hypertrophy of the Prostate," *Medical News*, January, 1889, p. 70.

² *Verhandlungen des X. internationalen medicinischen Congresses*, Berlin, 1890, Abth. vii., p. 95.

³ *Centralblatt für die Krankheiten der Harn- und Sexual-Organen*, Bd. viii., p. 171.

find that so far only a few authors have tried this method besides Bottini, who, as stated before, has operated in more than eighty cases. Up to 1890 Bruce Clark was the only one who reported a successful case. He made use of the cauterizator. When discussing Bottini's paper, read before the Tenth International Medical Congress, at Berlin, in 1890, Clark stated¹ that this patient was still alive, could urinate without difficulty, and had gotten rid of his catheter. Without giving further details, he added that he never since had a similar result. How many cases this "never since" comprises remains doubtful. He certainly did not make use of a sufficiently strong current, for he himself says that "the current which I employed was a much weaker one" (than that of Bottini).

H. Kümmel, of Hamburg,² has operated with the cauterizator on a number of patients with hypertrophy of the prostate and retention, and is well satisfied with his results.

V. Czerny, of Heidelberg, has used the incisor five or six times,³ and, although he had a very inferior battery, has never noticed an ill result, but in the majority of cases a marked improvement—spontaneous micturizion, or at least easier introduction of the catheter. He remarked last year that Bottini's operation deserves more attention than it has hitherto received.

Watson⁴ states that he has had some experience with Bottini's method. He wants it reserved for cases with a hypertrophied median lobe.

L. Casper⁵ has done the operation seven times on six patients—twice with satisfaction, three times with quite a good result, the sixth case being of too recent date to admit of drawing conclusions. He feels so

¹ Verhandlungen des X. internationalen medicinischen Congresses, Berlin, 1890, Abth. vii., pp. 95, 96.

² Berliner Klinik, August, 1895, p. 8.

³ Deutsche medicinische Wochenschrift, 1896, No. 16, p. 243.

⁴ Report of the International Medical Congress at Moscow, 1897, afternoon meeting of August 21st.

⁵ Berliner klinische Wochenschrift, 1897, No. 45, p. 930.

much encouraged that he will continue to use the method.

Next to Bottini, Freudenberg has had the most extensive experience. He at first published five cases in which he operated with Bottini's incisor.¹ Of three of his patients who had suffered for months with complete urinary retention, one—who was operated upon twice, six days intervening—commenced to pass his water on the tenth and fourth days respectively after the operation; the two others began to void their urine spontaneously three and four hours after the operation. In a second group, comprising two patients who still were able to pass water, but had to urinate every twenty or thirty minutes with a great deal of pain if they did not catheterize themselves, the operation had a very favorable result with regard to the frequency of micturition. All of the five patients have gotten rid of the catheter; all have materially gained in weight and improved in general health; two of them—one a patient of eighty-one, the other sixty-seven years of age—who were in a deplorable condition before the operation, were evidently saved by the interference.

When demonstrating his last patient thus operated upon, before the Berlin Medical Society, October 20, 1897, Freudenberg mentioned that he had performed Bottini's operation eighteen times on fifteen patients; that he had always used the incisor, and three times his modification of the original instrument, to his greatest satisfaction. The case then presented is of such importance that I will here briefly append the history:

The patient, sixty-three years of age, had been a slave to the catheter on account of complete urinary retention for the last three years and a half. On June 5, 1894, both his testicles had been removed by Casper, of Berlin. The retention remained unimproved. Three years later the patient still had to catheterize himself four or five times in twenty-four hours. In spite of regular, careful irrigation of the bladder, some vesical catarrh was always present. The prostate was

¹ Berliner klinische Wochenschrift, 1897, No. 15.

very soft and bulged into the rectum; the upper end could not be reached with the finger. On April 22, 1897, almost three years after castration, Freudenberg performed Bottini's galvano-caustic radical operation on this patient. He burnt three grooves—one directly backward, three centimetres long; one of the same length through the left lateral lobe; and one, two centimetres long, anteriorly. Five and one-half hours after this operation the patient commenced to void his urine spontaneously; ten or twelve days later he voluntarily emptied his bladder almost completely, and after May 31st, or thirty-four days after the operation, the catheter was not used any more. Six months later the patient urinated in a good stream without any difficulty six or eight times in twenty-four hours, including once during the night. The urine had become perfectly clear. This improvement of the affection of the bladder had taken place without the use of strychnine, electricity, or cold intravesical douches. The patient had taken salol and urotropin internally. He had also lost his former constipation—an observation made by Freudenberg a number of times in patients on whom he had done Bottini's operation. The patient had gained seven pounds, although he had been quite stout before. He enjoyed life and regretted the loss of his testicles.

Bottini reported ¹ a similar case, in which vasectomy had been done before, also without improving the bladder function. His operation cured the patient.

These cases speak for themselves. They prove beyond a doubt that the effect of Bottini's operation means the successful overcoming of the mechanical obstruction offered to the outflow of urine by the hypertrophied prostate. They also refute Lenander's (Upsala) explanation as to the effect of Bottini's operation, ² viz., that the cautery knife burns the caput galinaginis and thereby destroys the ejaculatory ducts, also the ganglia and nerves which run to the seminal

¹ La Clinica Chirurgica, 1897, No. 4.

² Centralblatt für Chirurgie, 1897, No. 22.

vesicles and the vasa deferentia; with other words, that Bottini's operation means about the same as the resection of the vas deferens.

My personal experience so far is very limited. I have operated three times on two patients; once with Bottini's and twice with Freudenberg's improved incisor (at time of publication, four times on three patients, three times with Freudenberg's instrument). Both men were still able to pass water, but urinated, always with a great deal of pain, every twenty or thirty minutes day and night. Both had unilateral or bilateral pyelitis and purulent catarrh of the bladder; their prostates were very soft; they had been treated by a number of doctors before.

In the first patient, fifty-eight years old, I have done the operation twice at the German Hospital, on October 7¹ and December 18, 1897. (The long interval was due to the delay in the arrival of a suitable battery from abroad.) The patient had, as made out by rectal palpation, a very small prostate—so small that one might have with propriety made the diagnosis of "prostatisme vésicale" (Guyon). But the gentle exploration of the interior of the bladder with the stone searcher demonstrated an enlarged gland, and the cystoscope showed the prostate bulging into the bladder and the internal urethral fold irregularly curved; there was no median lobe. All clinical symptoms generally found in prostatics were well defined. Voluntary urination, 25 c.c.; residual urine, 300 c.c. When the bladder was emptied he had excruciating pain. For this reason I put him under general anæsthesia for both operations (Schleich's solution No. 1). I satisfied myself that the interference is a simple one for the doctor who is used to doing intravesical instrumentation. I was astonished to note how easily the prostatic tissue could be penetrated; it appeared to be extremely soft in this case. Although I had carefully gauged the heat-

¹ This seems to have been the first Bottini operation on this side of the ocean. I did not find a single case previously reported in American medical literature.

ing of the knife before introducing the instrument, and although my assistants on auscultating the suprapubic region were sure to hear the noise of the cautery, I am under the impression that at the first operation, October 7th, I had not heated the platinum knife sufficiently (I had omitted to test the heated knife first on a piece of moist aseptic gauze), and that I cut the grooves too fast (a great deal of unburnt prostatic tissue adhered to the knife when the instrument was removed). At that time my storage battery was an unsatisfactory one. The operation itself (three grooves, 2.5, 2.5, and 1 cm., were cut) had lasted scarcely five minutes; there were no ill after-effects. The patient was up and about the next day. At his request he was soon discharged. Six weeks later he urinated just as often as before the operation, but without any pain. Ten weeks after the operation he passed water not quite so often as before during the day; at nights, only three or four times. The amount of residual urine was unchanged (15:280 c.c.). My proposition, which I had also made before the operation—namely, to draw off the residual urine—was again refused on account of the pain that set in when the bladder was emptied. On December 18, 1897, a second operation was performed with Freudenberg's modified incisor and a storage battery from Berlin. The patient again stood the operation well, and was up on the following day. Being opposed to subsequent local treatment, he left the hospital a few days later.

On February 16, 1898, I saw him at my office for the first time after the operation, and was greatly pleased to get from him the following report: A few days after the operation partial incontinence (dribbling) set in, more pronounced during sleep. This lasted two weeks. From that time on improvement has been gradual and continuous. To-day the patient does not experience any pain whatsoever; urinates three or four times during the day, twice during the night; amount each time about six or seven ounces, which is passed in the course of three or four

minutes. For three weeks past he has been at work in his former occupation; he has gained in weight. When at my office he declared he had no desire to urinate, but I made him do so, nevertheless. He passed 20 c.c. (residual urine, 180 c.c.). The patient pronounced the small quantity passed an exceptional occurrence. Certainly we have a right to call his condition to-day much improved.

The amelioration of the different symptoms in this case is entirely due to Bottini's operation, because the patient did not undergo any after-treatment whatsoever. The few vesical irrigations carried out at the hospital after the operations, also during November at my office, made him decidedly worse. I must confess I had not expected so gratifying a result in this case, and therefore also feel very hopeful as to the future of this method of operation. The urine at present is acid, but very turbid. I have urged the patient now to undergo local treatment. I shall not fail to report on the progress of this case after some time.

My second patient, a man of seventy-three, was in a deplorable condition when he came under my care. Residual urine, 10:160 c.c. Prostate not large and very soft on rectal palpation, upper border could be reached; but found with the searcher to be considerably hypertrophied. Cystoscopy: Markedly trabecular bladder; diverticulum in right part of fundus; no stone; no enlarged median lobe; body of gland distinctly bulging inward. December 23, 1897, after preliminary careful irrigation, three cuts under cocaine—posteriorly and to the right, 3 cm.; anteriorly, 1.5 cm. No subsequent hemorrhage, no fever; patient up on the following day. Until January 8th, there was no improvement; the patient then entered another hospital. Meanwhile he has died, without having been benefited by the operation.

Since reading this paper at Albany, I have done Bottini's operation on a third patient, sixty-four years of age, who had suffered from increased frequency of micturition and repeated hæmaturia; also from catarrh

of the bladder and bilateral pyelitis during the last two years. The patient died thirty hours after the operation, with very high temperature and a failing heart (acute sepsis [?]). I deem the case of great importance, and will therefore here append its history. The patient was first seen by me on December 13, 1897. He then stated that one year ago, when in the northern part of the State, he contracted a cold and for the first time passed blood on urinating. He was brought to a nearby city, where he was put to bed and treated by a doctor. He soon returned to his home in New York. During the hot summer months hæmaturia returned twice. After the last attack a doctor introduced a searcher into the bladder. The answer was bilateral epididymitis. On examination I found the patient to be greatly reduced, pale, and nervous; the epididymis on either side was much enlarged and painful. One hundred and fifty cubic centimetres of urine was passed voluntarily; residual urine, 450 c.c. The urine was turbid, contained one-fourth per cent. of albumin, no sugar, a considerable amount of pus, a moderate amount of mucus, hyaline casts, and cells of all layers of the bladder, also groups from the renal pelvis. The daily excretion of urea and chlorides was not quite up to the normal. The prostate was soft, large, bulging into the rectum; its upper end could not be reached with the finger. The region of both kidneys proved sensitive on pressure. The patient's stomach was constantly upset; he had not taken any solid food for some weeks, and had had frequent vomiting. Cystoscopy (December 20, 1897) was very difficult, on account of hemorrhage; Nitze's irrigating cystoscope was used. I got only one good glance at the interior of the bladder, and saw a very pronounced trabecular condition; no stone; median lobe (?).

During the subsequent weeks I washed out the bladder very carefully under aseptic precautions, every second or third day at my office, and put the patient on increasing doses of urotropin. The condition of his bladder improved, but of course not that of his kid-

neys. I frequently noticed that, when leaving the catheter *in situ* after careful flushing of the vesical viscus, a few drops of turbid urine would soon run out suddenly, although the irrigating fluid had before repeatedly returned perfectly clear. The clinical diagnosis of unilateral, perhaps bilateral pyelitis was established beyond a doubt. The improvement of the vesical catarrh, however, did not materially improve the patient's general condition. He continued to urinate every thirty to ninety minutes day and night; the residual urine did not diminish. His stomach remained very irritable; he had absolute aversion against solid food. He lost continually in weight, despite the most tender nursing by his devoted wife. Something had to be done. After careful deliberation I resolved to do Bottini's operation. It was performed at the patient's home, on January 29, 1898. All instruments to be used were carefully sterilized according to standard rules, as was also Freudenberg's modification of Bottini's incisor, which, as mentioned above, can well be boiled; my own and the assistant's hands were disinfected in the same way as in other operations. After irrigation of the anterior urethra the urine was withdrawn from the bladder, and the posterior urethra and bladder were repeatedly washed out with a two-per-cent. sterile boric solution. During the latter part of this procedure the patient was brought under the influence of Schleich's solution No. 1. Also in this case I thought it best to use general anæsthesia, on account of the painful, spasmodic contractions of the emptied bladder. At the same time I gauged the amount of current needed to make the knife red hot, tried its efficient working on a piece of moist sterile gauze, and properly arranged the irrigation through the cooling apparatus, which latter matter was in the hands of a trustworthy assistant. As soon as the irrigating water returned entirely clear and the bladder was emptied, the catheter was withdrawn. Next, Freudenberg's incisor was lubricated with glycerin and introduced. As I had raised the patient's hips on a hard pillow,

thus putting him in a slightly recumbent posture,¹ it was not difficult to make the instrument enter the bladder, although the latter was entirely empty. Three grooves were cut—one posteriorly in the median line, 3.5 cm. long; another through the right lateral lobe, of the same length; and a third one, 1.5 cm. long, toward the front. Then the instrument was withdrawn and the patient brought to bed. The whole procedure had lasted not longer than five or six minutes. The operation was completed at 4 P.M. The patient was awake about five minutes later. There was a little bleeding from the urethra. It came from the external meatus, which was rather narrow. The same had been noted when I had performed cystoscopy on this patient. A nurse was put at his side.

Ten hours after the operation, at 2 A.M., January 30th, I received a report from the nurse that the patient, at 1 A.M., had had a severe chill, lasting about thirty-five minutes; that the temperature, which previously had been 99° F., had risen to 103.8° F.; and that the pulse, which had been 80 before, was 122. At 11 P.M., seven hours after the operation, he had urinated about three ounces, slightly tinged with blood, in the recumbent posture—a procedure which had not been possible within the last year. Since the chill he had been rather restless, but had very little pain; after a while he seemed to become delirious.

When I arrived at the patient's home, at 2:45 A.M., I found a colleague at his bedside, who reported that he had been obliged to administer one-fourth grain of morphine, on account of the sudden wildly delirious condition of the patient, who now rested on his back quietly in profound sleep. I at once made the necessary preparations for an aseptic catheterization and

¹ Such a posture is of great value. It facilitates the introduction of the instrument into the empty viscus; the region of the prostate being more elevated than the fundus of the bladder, the small amount of urine which will descend from the kidneys, during the short operation, will run into the fundus; thus the field of operation is kept dry.

irrigation of the bladder. I withdrew 350 c.c. of a slightly sanguinolent urine of alkaline odor. Upon irrigation the fluid soon returned absolutely clear. I was satisfied that there was no hemorrhage coming from the prostate gland. At 3:30 A.M. the patient's temperature was 106.8° F.; pulse, 140. We then at once started with hypodermic stimulation and rectal injections of hot saline solution with whiskey. Later in the day we added continued rectal irrigation (Kemp) with saline solution of 105° F., to which was added salicylate of sodium, so as to make a one-percent. solution of the same. On catheterization at 12 M. the bladder was found to contain only half an ounce of urine. There was no hemorrhage. But, in spite of all efforts, the temperature did not come down nor did the heart respond to stimulation. The patient died at 10 P.M., without having regained consciousness.

To my regret, permission for a post-mortem examination could not be obtained.

In reviewing this case I cannot make any other diagnosis of the immediate cause of death than that of foudroyant sepsis, although the patient had a moist tongue until his death. And this sepsis had occurred in spite of the most careful aseptic work before, during, and after the operation.

The other diagnosis which might come into consideration as the immediate cause of death is embolism of the lungs, which, as stated above, has been observed in another case subjected to Bottini's operation by Freudenberg. However, a very able medical man, who saw the patient with me, on auscultation could not find any symptoms that would justify such an assumption. There were also missing the rapid respiration, the cough, etc.

Certainly this case gives a great deal to think about. Two questions principally present themselves for discussion:

1. Was it correct to perform Bottini's operation on this patient at once? Would it not perhaps have been better first to have insisted upon resection of the vasa deferentia or of the principal vessels and nerves of the

spermatic cord (Albarran's angio-neurectomy), especially in view of the bilateral chronic epididymitis, before resorting to a direct interference with the gland?

2. If the patient really died of acute sepsis, where had been the point of entrance of the streptococci?

With reference to the first of the two questions, future experience must decide whether we are justified in always giving Bottini's operation the first place when trying to bring radical relief to a patient suffering from hypertrophied prostate and its sequela. At present I do not believe that Bottini's operation, as Freudenberg seems inclined to think, should always be our first choice. Perhaps more extended experience may show it to be more advisable in all cases when pyelitis is surely present, when the prostate is soft and easily bleeding, when the patient's condition is run down and the urethra and bladder are not used to frequent instrumentation,¹ first to resect the vasa deferentia (or do Albarran's operation), and await the result of this operation, provided waiting is permissible, and then, if necessary, add Bottini's operation.

According to present views the effect of the several operations mentioned, as also of castration, is to be found in a depletion of the enlarged, intimately connected, venous plexuses of the prostate, of the neck and of the wall of the bladder. And this depletion is due² to direct or to reflex irritation of vasomotor sympathetic fibres that were affected by the operation and now produce a contraction of the vascular walls. We can more or less rely upon this result of the operation. If, after this much has been achieved, the patient should still be unable to pass urine voluntarily or in a sufficient quantity, the galvano-caustic division of the prostate, as stated above, should be added instead of castration. The patient will then have more assurance

¹ I specially emphasize these points. The remarks following refer to such patients only.

² Hoffmann: "Beiträge zur operativen Behandlung der Prostatahypertrophie," Beiträge zur klinischen Chirurgie, Band xix., Heft 3, p. 541.

that he will not succumb to an embolism of the lungs—one of the two principal dangers, as it seems, of Bottini's operation. It is reasonable to believe that such embolism is to be traced to the thrombi made by the galvano-caustic knife in the large veins of the prostatic plexus. Although so far this occurrence has been observed and proved by post-mortem examination but once (Freudenberg), we must admit the possibility of a repetition. The patient will, furthermore, not be deprived of having intercourse or be exposed to the possible consequences of castration (mental disturbance, etc.).¹

Question No. 2: Where has been the point of entrance for the streptococci in the case just related? Can we avoid at all, and, if so, how can we avoid sepsis, the second danger, in my opinion, connected with Bottini's operation?

It is evident that a trabecular bladder of a prostatic cannot be properly disinfected by continued irrigation. It is obvious that vesical irrigation does not influence the renal pelvis. The latter can be prepared for the operation by internal medication only—urotropin and salol. The fear, therefore, that a wound made within a bladder that cannot be reliably disinfected and remains a closed viscus after the operation—a viscus that is not drained as we are used to do after suprapubic or perineal incision—I say, the fear that such a wound may be the direct cause of infection to the patient must certainly be entertained. I believe that this danger does exist, although to but a limited extent. The eschar produced by the red-hot Bottini knife will generally be very slowly pushed off, certainly not before the fourth or fifth day, and this pushing off is caused by the reaction of the surrounding living tissues, namely, granulation. We all know that, if not irritated, such a granulating surface forms the best

¹ In view of the rather doubtful permanent results of vasectomy (cf. Hoffmann, *l. c.*), it seems to me to be a good plan to do Bottini's operation in every one of these cases, one to two weeks after vasectomy.

barrier against infection, and not the entrance for infectious micro-organisms.

But it should not be forgotten that a thrombus is formed in the prostatic veins by the cautery. Prostatic patients with pyelitis often are in a state of chronic sepsis (I am sure my patient was in that condition)—that is to say, streptococci circulate within their blood, but are not virulent enough to produce acute general infection; but as soon as traumatism takes place the locus minoris resistentiæ is established. In the coagulated blood, their best culture medium, the streptococci or the bacterium coli commune rapidly multiply and become more virulent. The proximal pole of the thrombus is the place whence absorption takes place and fatal systemic infection sets in.

Nevertheless I believe that in a case of death from sepsis as a result of Bottini's operation the infection will oftener make its way through the kidney or kidneys than through the wounds of the prostate gland. In the case of an old prostatic with secondary dilatation of the ureters and renal pelves from back pressure, the bladder and ureters and the renal pelvis or pelves are, in a physical sense, but one cavity; infected urine, if retained, easily reaches the kidneys. And even if ureters and renal pelves have not become chronically distended by the prostatic obstruction, the infection of these patients by way of the kidney is possible. The interesting experiments of Lewin and Goldschmidt¹ have demonstrated beyond a doubt that direct, we might say physical communication exists between bladder and heart in an opposite direction to that of the current of the blood. According to these experiments, soluble material (colored fluid, ultramarine) and insoluble material (air) can reach the right

¹ L. Lewin and H. Goldschmidt: "Kurze Mitteilung einer Beobachtung aus dem Gebiete der Nieren-Pathologie," Deutsche medicinische Wochenschrift, 1897, No. 38, p. 601. L. Lewin: "Der Uebertritt von festen Körpern und Luft aus der Blase in die Nieren und in entferntere Körper-Organen," Deutsche medicinische Wochenschrift, 1897, No. 52, p. 825.

ventricle by way of the renal vein and inferior vena cava. Under certain conditions the ureteral mouth of even a normal vesical viscus can suddenly gape, its normal closure toward the kidney can become insufficient. By means of the difference in pressure between the bladder and renal pelvis, also of the antiperistaltic contraction of the ureter, the soluble as well as insoluble matter can now ascend from the bladder to the pelvis of the kidney, whence it enters the lymphatics, the veins, and the uriniferous tubules, and is conveyed to the right ventricle. Then the current of blood transports the foreign substance into the other organs, principally lungs and liver.

By these experiments a path has been shown by which foreign substances, and much more readily, of course, infectious micro-organisms, may enter the general circulation. The experiments also tend to explain "the sudden appearance of a general systemic infection" after intravesical interference, the cause of the occurrence of which, in a pathologic sense, has hitherto been rather obscure. That such a retrograde wave within the uropoietic system is all the more apt to set in, if the cavities and canals of the latter are in a state of pathologic distention, is obvious.

I therefore am of the opinion that, if my patient did die of sepsis, the infection took place in the manner of Lewin's experiments. This taken for granted, one question yet has to be answered: Why did this septic infection set in after Bottini's operation? Why not sooner—for instance, after ordinary catheterization or after cystoscopy? I shall not venture to try and explain this, as it could be done only on basis of further hypotheses. But we shall perhaps be better able to understand it by assuming that in dividing the prostate down to the floor of the bladder and near to the membranous portion of the urethra, the galvanocautery struck a small inflamed focus within the prostatic tissue, which contained especially virulent micro-organisms; and that these, added to the other inhabitants

of the bladder and renal pelves, sufficed to produce the explosion.

Further, after all other instrumental manipulations within the bladder—such as, for instance, cystoscopy, litholapaxy, etc.—we make it a rule, so as to have done our share to avoid infection, to irrigate the urethra and bladder after the interference, and let the patient, if possible, spontaneously void the injected fluid; while in Bottini's operation, having finished the work, we extract the incisor and stop right there. Now I believe that the early withdrawal of 200 or 300 c.c. of urine (which certainly is not sterile) from the bladder, and aseptic irrigation of this viscus a few hours after the operation, might possibly avert to a great extent the danger imminent from this source.

I have tried to explain the occurrence of the septic infection in my patient somewhat exhaustively, for the sake of avoiding as much as possible similar experiences in the future. That I thought of it a great deal can be imagined. In order to be just, however, the fact must be emphasized that Bottini has not lost a single case from sepsis, nor has Freudenberg, Czerny, or Kümmel; and their practical experience combined embraces over one hundred patients. My case evidently is an exceptional one; but it shows that Bottini's operation also has its deaths, and that it shares the risks involved in all the other operative methods so far proposed for the radical treatment of this grave trouble.

What I am anxiously waiting for now is a patient with complete retention, one who has been entirely or almost entirely a catheter slave for a long period. In perusing the literature of the subject, we find that it is this class of cases which has derived the greatest benefit from Bottini's operation. By means of the frequent slight reinfection, which almost always occurs when patients catheterize themselves, no matter how careful they may be, their system seems to have acquired a kind of immunity against an acute septic infection of the streptococci and other pathogenic micro-organisms

which inhabit the bladder. Even with a pyelitis these patients will probably much better stand direct interference than those who have been only occasionally subjected to local treatment by their physicians.

I am sure we shall learn to select prostatic cases which are especially adapted for Bottini's operation; I also believe that we shall learn in course of time to pick out such cases as should be primarily subjected to operations on the spermatic cords or to castration, eventually also to prostatectomy. Much will have to be learned yet in that respect.

But certainly we can to-day say of Bottini's operation that it leaves the important anatomical parts absolutely intact, without destroying tissues which for certain periods of the life of the male subject are of great importance (vasa deferentia, testicles), and without sharing, to a great extent at least, the dangers of other radical operations (ligation of internal iliacs, total extirpation). It furthermore certainly appeals to our common sense that, if the mechanical division of a mechanical obstruction can be rendered a permanent one in a comparatively safe manner with the help of absolutely reliable instruments, the method must be a good one.

It therefore seems to me that Bottini's operation decidedly deserves to be given a careful and unbiassed test. Should it really prove to be of such great value in the greater number of cases of this dreadful, so frequently in its remote consequences fatal disease, it will become our duty to give this operation not only a firm place, but one of the first places on the stepladder of the multitude of operations so far devised for the radical cure of hypertrophy of the prostate gland.

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